SEQUENCE LISTING

<110> INTERNATIONAL LIVESTOCK RESEARCH INSTITUTE

<120> EAST COAST FEVER VACCINE BASED ON CTL-SPECIFIC
     SCHIZONT ANTIGENS

<130> 41860-205200

<140>
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<150> 60/486,750
<151> 2003-07-14

<160> 77

<170> PatentIn Ver. 3.2

<210> 1
<211> 543
<212> PRT
<213> Theileria parva

<400> 1

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Met Arg Val Lys Lys Val Leu Leu Tyr Thr Leu Pro Val Val Gly Ile
  1               5                  10                  15

Leu Leu Ala Gly Ser Leu Ile Ile Phe Asn Phe Val Arg Lys Arg Pro
             20                  25                  30

Glu Lys Glu Glu Glu Leu Lys Pro Pro Ser Ala Leu Glu Asp Glu Leu
         35                  40                  45

Lys Lys Arg Glu Glu Glu Ser Arg Lys Arg Met Glu Glu Met Gln Lys
     50                  55                  60

Glu Ile Leu Glu Lys Lys Leu Arg Glu Gly Lys Lys Ala Leu Glu Glu
 65                  70                  75                  80

Leu Glu Lys Arg Glu Lys Glu Val Val Asp Glu Phe Ala Lys His Leu
                 85                  90                  95

Lys Lys Pro Glu Glu Arg Leu Pro Lys Ile Ile Leu Thr Leu Asp Ser
            100                 105                 110

Gly Phe Pro Thr Val Asp Pro Ile Thr Tyr Thr Ser Gly Val Tyr Met
            115                 120                 125

Val Ala Val Ser Lys Thr Thr Phe Thr Ser Asp Ser Asp Leu Val Asp
        130                 135                 140

Phe Thr His Thr Leu Leu Gly Ile Lys Phe Leu Val Thr Gly Val Gln
145                 150                 155                 160

Phe Gly Gly Lys Thr Tyr Thr Ile Lys Pro Ile Glu Ala Thr Met Ala
                165                 170                 175
```

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Thr Ser Ile Ala Phe Ala Ala Asp Pro Gly Phe Cys Tyr Phe Leu Leu
            180             185                 190

Ile Pro Gly Pro Asp Ser Lys Pro Ile Phe Phe Lys Asn Asp Gly Asp
        195             200                 205

Lys Phe Leu Arg Cys Val Gly Tyr Pro Lys Val Lys Glu Glu Met Leu
    210             215                 220

Glu Met Ala Thr Lys Phe Asn Arg Leu Pro Lys Gly Val Glu Ile Pro
225             230             235                 240

Ala Pro Pro Gly Val Lys Pro Glu Ala Pro Thr Pro Thr Pro Thr Thr
            245             250             255

Ile Thr Pro Ser Val Pro Pro Thr Ile Pro Thr Pro Ile Thr Pro Ser
        260             265             270

Ala Pro Pro Thr Thr Pro Pro Thr Gly Leu Asn Phe Asn Leu Thr Val
        275             280             285

Gln Asn Lys Phe Met Ile Gly Ser Gln Glu Val Lys Leu Asn Ile Thr
    290             295             300

His Glu Tyr Glu Gly Val Tyr Glu Ala His Lys Tyr Phe Ile Glu Arg
305             310             315                 320

Gly Ser Phe Thr Pro Thr Ser Phe Ser Ile Gly Asp Leu Pro Gln Thr
            325             330             335

Gly Leu Pro Val Asn Gln Thr Val Asp Thr Ile Val Val Tyr Phe His
            340             345             350

Arg Val Thr Met Gly Glu Pro Val Gly Ile Pro Leu Ile Val Leu Ile
            355             360             365

Phe Tyr Lys Asn Gln Ser Arg Lys Tyr Leu Asn Lys Gly Asn Gly Asn
    370             375             380

Trp Glu Glu Ser Lys Ala Leu Leu Phe Arg Glu Glu Leu Asp Tyr Leu
385             390             395                 400

Asp Ser Ile Phe Asn Asp Phe Val Thr Val Asn Leu Ser Arg Arg Ser
            405             410                 415

Asp Tyr Tyr Arg Asn Gly Thr Gly Thr Ser Glu Ile Glu Gln Thr Leu
            420             425                 430

Asp Met Asn Val Tyr Val Glu Pro Asp Thr Pro Cys Ala Gly Trp Thr
            435             440             445

Thr Tyr Ile His Lys Leu Glu Glu Gly Gly Glu Gly Gly Ile Glu Lys
    450             455             460
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```
Pro Phe Gln Ile Arg Gln Leu Trp Phe Ser Lys Gln Lys Phe Asp Ile
465             470             475             480

Phe Pro Met Gly Lys Val Ser Ile Val Asn Val Tyr Gly Lys Asn Asp
            485             490             495

Glu Pro Leu Ser Tyr Ala Pro Ser Ile Phe Ser Val Ile Arg Glu Asp
            500             505             510

Gly Ile Gln Ile Phe Tyr Val Arg Ala Tyr Ser Gln Tyr Leu Leu Asp
            515             520             525

Ser Ser Val Asn Pro Gln Asn Leu Pro Gln Lys Leu Asn Thr Leu
530             535             540
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<213> Theileria parva

<400> 2

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Met Ser His Leu Met Asn Leu Pro Ile Leu Val Leu Lys Glu Gly Thr
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Asp Thr Ser Gln Gly Gln Ala Gln Ile Ile Ser Asn Ile Asn Ala Cys
            20              25              30

Gln Ala Ile Val Asp Cys Val Lys Thr Thr Leu Gly Pro Arg Gly Met
        35              40              45

Asp Lys Leu Ile His Thr Glu Arg Asp Val Thr Ile Thr Asn Asp Gly
    50              55              60

Ala Thr Val Leu Lys Leu Leu Asp Ile Thr His Pro Ala Ala Ser Val
65              70              75              80

Leu Val Asp Ile Ala Lys Ser Gln Asp Asp Glu Val Gly Asp Gly Thr
            85              90              95

Thr Ser Val Thr Val Leu Ala Gly Glu Leu Leu Asn Glu Ala Lys Ala
        100             105             110

Phe Ile Leu Asp Gly Ile Ser Pro Gln Val Ile Ile Lys Tyr Tyr Arg
        115             120             125

Glu Ala Cys Gln Val Ala Leu Asn Leu Ile Asp Lys Val Ala Ile His
    130             135             140

Leu Ser Asn Lys Ser Ser Thr Asp Lys Lys Glu Leu Leu Ile Lys Cys
145             150             155             160

Ala Glu Thr Thr Phe Asn Ser Lys Leu Leu Ser Gly Tyr Lys Thr Phe
            165             170             175

Phe Ala Lys Met Val Val Glu Ala Val Ala Thr Leu Asp Glu Asp Leu
        180             185             190
```

```
Asp Glu Asp Met Ile Gly Val Lys Lys Val Thr Gly Gly Ser Cys Glu
        195             200             205

Asp Ser Leu Leu Val Lys Gly Val Ala Phe Lys Lys Thr Phe Ser Tyr
        210             215             220

Ala Gly Ala Glu Gln Gln Pro Lys Lys Phe Val Asn Pro Lys Ile Leu
225                 230             235                 240

Leu Leu Asn Leu Glu Leu Glu Leu Lys Ser Glu Lys Glu Asn Ala Glu
                245             250             255

Ile Val Ile Asn Asn Pro Gln Glu Tyr Gln Lys Ile Ile Asp Ala Glu
            260             265             270

Tyr Arg Ile Ile Phe Glu Lys Leu Glu Asn Ala Val Lys Leu Gly Ala
        275             280             285

Asn Val Val Leu Ser Lys Leu Pro Ile Gly Asp Leu Ala Thr Gln Tyr
    290             295             300

Phe Ala Asp Lys Asn Val Phe Cys Ala Gly Arg Val Asp Glu Asn Asp
305             310             315             320

Leu Ile Arg Thr Ser Lys Ala Thr Gly Ala Ser Ile Gln Thr Thr Leu
            325             330             335

Asn Asn Leu Ser Val Asp Val Leu Gly Thr Cys Gly Val Phe Glu Glu
            340             345             350

Val Gln Ile Gly Ser Glu Arg Tyr Asn Met Phe Thr Asp Cys Lys Ser
        355             360             365

Ala Lys Thr Cys Thr Ile Val Leu Arg Gly Gly Gly Gln Gln Phe Ile
370             375             380

Asp Glu Ser Glu Arg Ser Leu His Asp Ala Ile Met Ile Val Arg Arg
385             390             395             400

Ala Thr Lys Cys Asn Thr Ile Leu Pro Gly Ala Gly Ala Ile Glu Met
            405             410             415

Leu Leu Ser Thr Tyr Leu Leu His Tyr Ser Leu Asn Thr Ile Asn Pro
            420             425             430

Thr Asp Ser Val Asn His Val Asn Cys Val Asn Ser Val Asn His Val
        435             440             445

Asn Gly Val Thr Gly Val Asn Lys Ser Leu Val Gly Lys Arg His Ile
    450             455             460

Ile Met Asn Gly Phe Ala Lys Ala Leu Glu Cys Ile Pro Arg Asn Leu
465             470             475             480

Ala Thr Asn Ser Gly Tyr Asn Ser Asn Asp Leu Leu Ser Ile Leu Arg
            485             490             495
```

Asn Lys Tyr Asn Gln Leu Glu Ile Val Asn Gly Glu Ile Lys Val Asn
            500   505   510

Asn Glu Glu Ser Trp Tyr Gly Ile Asp Cys Tyr Lys Gly Ser Val Cys
            515   520   525

Asn Ala Tyr Lys Ala Cys Ile Trp Glu Pro Ser Leu Val Lys Lys Asn
    530   535   540

Ser Ile Tyr Ser Ala Thr Glu Ala Ala Cys Leu Val Leu Ser Val Asp
545   550   555   560

Glu Thr Val Lys Asn Gln Ser Arg Gln Gln Leu Gln Ser Ala Leu Pro
                565   570   575

Gln Pro Lys

<210> 3
<211> 155
<212> PRT
<213> Theileria parva

<400> 3
Met Pro Lys Asn Lys Gly Lys Gly Gly Lys Asn Arg Arg Arg Gly Lys
  1   5   10   15

Asn Asp Asn Glu Gly Glu Lys Arg Glu Leu Val Phe Lys Met Glu Asp
            20   25   30

Gln Glu Tyr Ala Gln Val Leu Arg Met Leu Gly Asn Gly Arg Leu Glu
            35   40   45

Ala Tyr Cys Phe Asp Gly Thr Lys Arg Leu Cys His Ile Arg Gly Lys
    50   55   60

Met Arg Lys Arg Val Trp Val Asn Ala Gly Asp Ile Ile Leu Val Ser
65   70   75   80

Leu Arg Asp Phe Gln Asp Ser Lys Ala Asp Val Ile Ala Lys Tyr Thr
                85   90   95

Ala Glu Glu Ala Arg Thr Leu Lys Ala Tyr Gly Glu Leu Pro Glu Ala
            100   105   110

Thr Lys Ile Asn Glu Thr Asp Val Tyr Asp Asp Glu Ala Asp Asn Cys
            115   120   125

Ile Asp Phe Gln Asp Val Ser Ser Glu Ser Glu Pro Glu Asp Glu Ser
    130   135   140

Gln Glu Glu Ser Asp Phe Asp Ile Asp Asp Leu
145   150   155

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<212> PRT
<213> Theileria parva

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Met Thr Ser Lys Asp Glu Thr Pro Asp Gln Glu Val Tyr Ala Phe Asn
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Ala Asp Ile Ser Gln Leu Leu Ser Leu Ile Ile Asn Ala Phe Tyr Ser
                20                  25                  30

Asn Lys Glu Ile Phe Leu Arg Glu Leu Ile Ser Asn Ala Ser Asp Ala
        35                  40                  45

Leu Glu Lys Ile Arg Tyr Glu Ala Ile Lys Asp Pro Lys Gln Ile Glu
    50                  55                  60

Asp Gln Pro Asp Tyr Tyr Ile Arg Leu Tyr Ala Asp Lys Asn Asn Asn
65                  70                  75                  80

Thr Leu Thr Ile Glu Asp Ser Gly Ile Gly Met Thr Lys Ala Asp Leu
                85                  90                  95

Val Asn Asn Leu Gly Thr Ile Ala Lys Ser Gly Thr Arg Ala Phe Met
            100                 105                 110

Glu Ala Leu Gln Ala Gly Ser Asp Met Ser Met Ile Gly Gln Phe Gly
        115                 120                 125

Val Gly Phe Tyr Ser Ala Tyr Leu Val Ala Asp Lys Val Thr Val Val
    130                 135                 140

Ser Lys Asn Asn Ala Asp Asp Gln Tyr Val Trp Glu Ser Thr Ala Ser
145                 150                 155                 160

Gly His Phe Thr Val Lys Lys Asp Asp Ser His Glu Pro Leu Lys Arg
                165                 170                 175

Gly Thr Arg Leu Ile Leu His Leu Lys Glu Asp Gln Thr Glu Tyr Leu
            180                 185                 190

Glu Glu Arg Arg Leu Lys Glu Leu Val Lys Lys His Ser Glu Phe Ile
        195                 200                 205

Ser Phe Pro Ile Ser Leu Ser Val Glu Lys Thr Gln Glu Thr Glu Val
210                 215                 220

Thr Asp Asp Glu Ala Glu Leu Asp Glu Asp Lys Lys Pro Glu Glu Glu
225                 230                 235                 240

Lys Pro Lys Asp Asp Lys Val Glu Asp Val Thr Asp Glu Lys Val Thr
                245                 250                 255

Asp Val Thr Asp Glu Glu Glu Lys Lys Glu Glu Lys Lys Lys Lys Lys
            260                 265                 270
```

```
Arg Lys Val Thr Asn Val Thr Arg Glu Trp Glu Met Leu Asn Lys Gln
    275             280             285

Lys Pro Ile Trp Met Arg Leu Pro Ser Glu Val Thr Asn Glu Glu Tyr
    290             295             300

Ala Ala Phe Tyr Lys Asn Leu Thr Asn Asp Trp Glu Asp His Leu Ala
305             310             315             320

Val Lys His Phe Ser Val Glu Gly Gln Leu Glu Phe Lys Ala Leu Leu
            325             330             335

Phe Val Pro Arg Arg Ala Pro Phe Asp Met Phe Glu Ser Arg Lys Lys
        340             345             350

Lys Asn Asn Ile Lys Leu Tyr Val Arg Arg Val Phe Ile Met Asp Asp
        355             360             365

Cys Glu Glu Leu Ile Pro Glu Trp Leu Ser Phe Val Lys Gly Val Val
    370             375             380

Asp Ser Glu Asp Leu Pro Leu Asn Ile Ser Arg Glu Thr Leu Gln Gln
385             390             395             400

Asn Lys Ile Leu Lys Val Ile Arg Lys Asn Leu Val Lys Lys Cys Leu
            405             410                 415

Glu Leu Phe Asn Glu Leu Thr Glu Lys Lys Glu Asp Phe Lys Lys Phe
            420             425             430

Tyr Glu Gln Phe Ser Lys Asn Leu Lys Leu Gly Ile His Glu Asp Asn
        435             440             445

Ala Asn Arg Ser Lys Ile Ala Glu Leu Leu Arg Phe Glu Thr Thr Lys
    450             455             460

Ser Gly Asp Glu Leu Val Ser Leu Lys Glu Tyr Val Asp Arg Met Lys
465             470             475             480

Ser Asp Gln Lys Tyr Val Tyr Tyr Ile Thr Gly Glu Ser Lys Gln Ser
            485             490             495

Val Ala Ser Ser Pro Phe Leu Glu Thr Leu Arg Ala Arg Asp Tyr Glu
            500             505             510

Val Leu Tyr Met Thr Asp Pro Ile Asp Glu Tyr Ala Val Gln Gln Ile
        515             520             525

Lys Glu Phe Glu Gly Lys Lys Leu Lys Cys Cys Thr Lys Glu Gly Leu
    530             535             540

Asp Leu Asp Glu Gly Glu Asp Glu Lys Lys Ser Phe Glu Ala Leu Lys
545             550             555             560

Glu Glu Met Glu Pro Leu Cys Lys His Ile Lys Glu Val Leu His Asp
            565             570             575
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Lys Val Glu Lys Val Val Cys Gly Thr Arg Phe Thr Asp Ser Pro Cys
            580   585   590

Ala Leu Val Thr Ser Glu Phe Gly Trp Ser Ala Asn Met Glu Arg Ile
            595   600   605

Met Lys Ala Gln Ala Leu Arg Asp Ser Ser Ile Thr Ser Tyr Met Leu
    610   615   620

Ser Lys Lys Ile Met Glu Ile Asn Pro Arg His Ser Ile Met Lys Glu
625   630   635   640

Leu Lys Thr Arg Ala Ala Asn Asp Lys Thr Asp Lys Thr Val Lys Asp
            645   650   655

Leu Val Trp Leu Leu Tyr Asp Thr Ala Leu Leu Thr Ser Gly Phe Asn
            660   665   670

Leu Asp Glu Pro Thr Gln Phe Gly Asn Arg Ile Tyr Arg Met Ile Lys
        675   680   685

Leu Gly Leu Ser Leu Asp Asp Glu Glu His Val Glu Glu Asp Ser Ser
    690   695   700

Met Pro Pro Leu Asp Glu Pro Val Val Asp Ser Lys Met Glu Glu Val
705   710   715   720

Asp

<210> 5
<211> 440
<212> PRT
<213> Theileria parva

<400> 5
Met Leu Gly Asn His Val Met Gly Ser Asn Ser Pro His Ile Lys Ile
    1   5   10   15

Leu Ser Ser Val Thr Phe Leu His Ile Ala Lys Met Glu Glu Val Glu
            20   25   30

Asn Val Lys Val Asp Ala Leu Glu Arg Val Asp Thr Glu Ser Val Leu
        35   40   45

Asn Tyr Asp Thr Val Leu Glu Lys Lys Pro Leu Arg Ser Ser Val Ala
    50   55   60

Ser Phe Phe Lys Arg Tyr Ser Ala Val Leu Val Ile Leu Thr Ala Val
65   70   75   80

Leu Leu Phe Thr Phe Thr Phe Ala Ala Ile Ala Leu Ser Ser Gly Arg
            85   90   95

Ser Ala Ile Arg Lys Asn Arg Glu Leu Leu Ser Val Glu Phe Glu Lys
        100   105   110

```
Leu Gln Phe Asp Asn Phe Val Thr Ile Lys Gly Glu Arg Glu Glu Asp
    115                 120             125

Phe Pro Lys Met Val Ala Glu Val Leu Tyr Lys Val Ala Val Glu Phe
    130             135             140

Asp Pro Lys Glu Glu Ala Leu Ile Tyr Val Gln Phe Asn Asp Phe Asn
145             150             155             160

Lys Gln His Asp Lys Lys His Asn Asn Tyr Arg His Lys Lys Thr Ser
                165             170             175

Tyr Thr Asn Phe Arg Asn Asn Leu Asn Asp Ile Asn Glu His Asn Ala
            180             185             190

Lys Pro Asn Leu Ser Tyr Thr Lys Asn Met Asn His Phe Gly Asp Ile
        195             200             205

Ser Ser Lys Asp Phe Met Lys Arg Tyr Thr Lys Lys Val Leu Leu Asn
210             215             220

Leu Pro Lys Asp His Val Ser Thr Tyr Asn Asn Asn Arg Pro Met Ser
225             230             235             240

Val Asp Leu Arg Ser His Gly Val Leu Thr Pro Val Lys Cys Gln Glu
            245             250             255

Glu Asn Glu Leu Ser Trp Pro Tyr Ser Val Val Ala Val Ala Glu Ser
            260             265             270

Phe Val Lys Lys Thr Ser Gln Lys Thr Val Ser Leu Ser Glu Lys Gln
        275             280             285

Leu Val Asp Cys Val Thr Asp Lys Lys Ser Ala Asn Asn Pro Phe Leu
    290             295             300

Gly Tyr Lys Tyr Leu Lys Asp Leu Gly Leu Phe Glu Ser Glu Leu Val
305             310             315             320

Asp Lys Ser Thr Thr Lys Cys Pro Ala Leu Glu Gly Glu Arg Phe Lys
            325             330             335

Val Pro Ser Tyr Ser Tyr Ser Tyr Glu Pro Asp Leu Val Ala Leu Leu
            340             345             350

Leu Asn Ala Gly Pro Leu Thr Val Pro Val Ala Val Ser Glu Asp Trp
        355             360             365

Gln Phe Tyr Ala Asp Gly Thr Leu Asp Val Cys Gly Ala Glu Leu Asn
    370             375             380

His Phe Leu Thr Leu Val Gly Val Ser Phe Asp Glu Lys Gly Asn His
385             390             395             400

Trp Ile Leu Lys Asn Ser Phe Gly Glu Gly Trp Gly Asn Lys Gly Tyr
            405             410             415
```

```
Leu Leu Leu Thr Arg Asn Ser Lys Glu Tyr Lys Asp Asp Cys Gly Leu
            420             425             430

Thr Ser Phe Ala Val Tyr Ala Val
        435             440


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<211> 543
<212> PRT
<213> Theileria parva

<400> 6
Met Arg Val Lys Lys Val Leu Leu Tyr Thr Leu Pro Val Val Gly Ile
  1           5               10              15

Leu Leu Ala Gly Ser Leu Ile Ile Phe Asn Phe Val Arg Lys Arg Pro
            20              25              30

Glu Lys Glu Glu Glu Leu Lys Pro Pro Ser Ala Leu Glu Asp Glu Leu
            35              40              45

Lys Lys Arg Glu Glu Glu Ser Arg Lys Arg Met Glu Glu Met Gln Lys
        50              55              60

Glu Ile Leu Glu Lys Lys Leu Arg Glu Gly Lys Lys Ala Leu Glu Glu
 65              70              75              80

Leu Glu Lys Arg Glu Lys Glu Val Val Asp Glu Phe Ala Lys His Leu
            85              90              95

Lys Lys Pro Glu Glu Arg Leu Pro Lys Ile Ile Leu Thr Leu Asp Ser
            100             105             110

Gly Phe Pro Thr Val Asp Pro Ile Thr Tyr Thr Ser Gly Val Tyr Met
            115             120             125

Val Ala Val Ser Lys Thr Thr Phe Thr Ser Asp Ser Asp Leu Val Asp
    130             135             140

Phe Thr His Thr Leu Leu Gly Ile Lys Phe Leu Val Thr Gly Val Gln
145             150             155             160

Phe Gly Gly Lys Thr Tyr Thr Ile Lys Pro Ile Glu Ala Thr Met Ala
            165             170             175

Thr Ser Ile Ala Phe Ala Ala Asp Pro Gly Phe Cys Tyr Phe Leu Leu
            180             185             190

Ile Pro Gly Pro Asp Ser Lys Pro Ile Phe Phe Lys Asn Asp Gly Asp
            195             200             205

Lys Phe Leu Arg Cys Val Gly Tyr Pro Lys Val Lys Glu Glu Met Leu
    210             215             220
```

```
Glu Met Ala Thr Lys Phe Asn Arg Leu Pro Lys Gly Val Glu Ile Pro
225             230         235             240

Ala Pro Pro Gly Val Lys Pro Glu Ala Pro Thr Pro Thr Pro Thr Thr
            245             250             255

Ile Thr Pro Ser Val Pro Pro Thr Ile Pro Thr Pro Ile Thr Pro Ser
        260             265             270

Ala Pro Pro Thr Thr Pro Pro Thr Gly Leu Asn Phe Asn Leu Thr Val
        275             280             285

Gln Asn Lys Phe Met Ile Gly Ser Gln Glu Val Lys Leu Asn Ile Thr
    290             295             300

His Glu Tyr Glu Gly Val Tyr Glu Ala His Lys Tyr Phe Ile Glu Arg
305             310             315             320

Gly Ser Phe Thr Pro Thr Ser Phe Ser Ile Gly Asp Leu Pro Gln Thr
            325             330             335

Gly Leu Pro Val Asn Gln Thr Val Asp Thr Ile Val Val Tyr Phe His
            340             345             350

Arg Val Thr Met Gly Glu Pro Val Gly Ile Pro Leu Ile Val Leu Ile
        355             360             365

Phe Tyr Lys Asn Gln Ser Arg Lys Tyr Leu Asn Lys Gly Asn Gly Asn
    370             375             380

Trp Glu Glu Ser Lys Ala Leu Leu Phe Arg Glu Glu Leu Asp Tyr Leu
385             390             395             400

Asp Ser Ile Phe Asn Asp Phe Val Thr Val Asn Leu Ser Arg Arg Ser
            405             410             415

Asp Tyr Tyr Arg Asn Gly Thr Gly Thr Ser Glu Ile Glu Gln Thr Leu
        420             425             430

Asp Met Asn Val Tyr Val Glu Pro Asp Thr Pro Cys Ala Gly Trp Thr
        435             440             445

Thr Tyr Ile His Lys Leu Glu Glu Gly Gly Glu Gly Gly Ile Glu Lys
    450             455             460

Pro Phe Gln Ile Arg Gln Leu Trp Phe Ser Lys Gln Lys Phe Asp Ile
465             470             475             480

Phe Pro Met Gly Lys Val Ser Ile Val Asn Val Tyr Gly Lys Asn Asp
            485             490             495

Glu Pro Leu Ser Tyr Ala Pro Ser Ile Phe Ser Val Ile Arg Glu Asp
            500             505             510

Gly Ile Gln Ile Phe Tyr Val Arg Ala Tyr Ser Gln Tyr Leu Leu Asp
        515             520             525
```

```
Ser Ser Val Asn Pro Gln Asn Leu Pro Gln Lys Leu Asn Thr Leu
    530             535             540
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<210> 7
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<213> Theileria parva

<400> 7

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Met Arg Val Lys Lys Val Leu Leu Tyr Thr Leu Pro Val Val Gly Ile
 1           5               10                  15

Leu Leu Ala Gly Ser Leu Ile Ile Phe Asn Phe Val Arg Lys Arg Pro
            20              25              30

Glu Lys Glu Glu Glu Leu Lys Pro Pro Ser Ala Leu Glu Asp Glu Leu
        35              40              45

Lys Lys Arg Glu Glu Glu Ser Arg Lys Arg Met Glu Glu Met Gln Lys
    50              55              60

Glu Ile Leu Glu Lys Lys Leu Arg Glu Gly Lys Lys Ala Leu Glu Glu
65              70              75              80

Leu Glu Lys Arg Glu Lys Glu Val Val Asp Glu Phe Ala Lys His Leu
            85              90              95

Lys Lys Pro Glu Glu Arg Leu Pro Lys Ile Ile Leu Thr Leu Asp Ser
        100             105             110

Gly Phe Pro Thr Val Asp Pro Ile Thr Tyr Thr Ser Gly Val Tyr Met
        115             120             125

Val Ala Val Ser Lys Thr Thr Phe Thr Ser Asp Ser Asp Leu Val Asp
    130             135             140

Phe Thr His Thr Leu Leu Gly Ile Lys Phe Leu Val Thr Gly Val Gln
145             150             155             160

Phe Gly Gly Lys Thr Tyr Thr Ile Lys Pro Ile Glu Ala Thr Met Ala
            165             170             175

Thr Ser Ile Ala Phe Ala Ala Asp Pro Gly Phe Cys Tyr Phe Leu Leu
            180             185             190

Ile Pro Gly Pro Asp Ser Lys Pro Ile Phe Phe Lys Asn Asp Gly Asp
        195             200             205

Lys Phe Leu Arg Cys Val Gly Tyr Pro Lys Val Lys Glu Glu Met Leu
    210             215             220

Glu Met Ala Thr Lys Phe Asn Arg Leu Pro Lys Gly Val Glu Ile Pro
225             230             235             240

Ala
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<213> Theileria parva

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<210> 9
<211> 11
<212> PRT
<213> Theileria parva

<400> 9
Val Gly Tyr Pro Lys Val Lys Glu Glu Met Leu
 1               5                  10


<210> 10
<211> 11
<212> PRT
<213> Theileria parva

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Ser His Glu Glu Leu Lys Lys Leu Gly Met Leu
 1               5                  10


<210> 11
<211> 11
<212> PRT
<213> Theileria parva

<400> 11
Lys Ser Ser His Gly Met Gly Lys Val Gly Lys
 1               5                  10


<210> 12
<211> 9
<212> PRT
<213> Theileria parva

<400> 12
Phe Ala Gln Ser Leu Val Cys Val Leu
 1               5


<210> 13
<211> 9
<212> PRT
<213> Theileria parva
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<400> 13
Gln Ser Leu Val Cys Val Leu Met Lys
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<210> 14
<211> 9
<212> PRT
<213> Theileria parva

<400> 14
Thr Gly Ala Ser Ile Gln Thr Thr Leu
  1   5

<210> 15
<211> 9
<212> PRT
<213> Theileria parva

<400> 15
Ser Lys Ala Asp Val Ile Ala Lys Tyr
  1   5

<210> 16
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<213> Theileria parva

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Glu Phe Ile Ser Phe Pro Ile Ser Leu
  1   5

<210> 17
<211> 9
<212> PRT
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Cys Gly Ala Glu Leu Asn His Phe Leu
  1   5

<210> 18
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<212> DNA
<213> Theileria parva

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ccttctgcat tagaagatga acttaaaaaa cgtgaagaag aaagccgaaa acgcatggaa 300
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gatacaccct gtgctggatg gacaacgtat atacataaat tagaagaagg aggtgaagga 1500
ggaattgaaa aacctttca aattagacaa ttatggttta gtaaacagaa atttgatata 1560
ttcccaatgg gaaaagtttc aatcgttaat gtttatggga aaaacgatga accgctatct 1620
tacgctccct caattttcag tgtaatacgc gaagatggaa ttcaaatatt ttatgttcgt 1680
gcttactcac agtacttgct tgattcaagt gttaatcccc aaaatttacc tcaaaaatta 1740
aacacccttt agattttttt taaaaaaatc atgtaatata attgttttg aaaaaaaaaa 1800
aaaaaaa                                                          1807
```

```
<210> 19
<211> 1740
<212> DNA
<213> Theileria parva

<400> 19
atgagtcatt taatgaacct accaatcctt gtattgaagg aaggcactga tacatcccaa 60
ggccaagctc aaatcattag taatatcaac gcctgtcaag ctattgtcga ttgtgttaaa 120
actactctag gtcctagagg aatggacaag ttgatacata cggagagaga tgtgacgata 180
accaatgacg gtgctactgt tttgaaatta cttgatatta ctcatcctgc cgcttctgtt 240
cttgttgata tcgctaaatc acaagatgat gaagtcggtg atgggactac ttccgttact 300
gttctagcag gtgagttatt gaatgaagct aaggcgttta tattggatgg gataagtcct 360
caggttatca taaaaatacta tcgtgaagcc tgtcaagttg ctttaaatct cattgataaa 420
gttgccattc atctctccaa caaatcctca actgataaga aagaactact gataaaatgt 480
gctgaaacta cttttaattc aaagttattg tctggttata aaacctttt tgccaagatg 540
gttgtggagg cagtggctac tttggatgag gacttggatg aggatatgat tggtgttaaa 600
aagtcactg gtggttcctg tgaggactca ctcctagtca agggtgtagc attcaagaaa 660
actttcagct acgctggggc tgaacaacag ccaaagaaat tcgtcaatcc aaagatttta 720
ttacttaatt tggaattgga actcaaatcc gaaaagaaa acgcagaaat tgttatcaat 780
aatccacaag aatatcagaa gataatagat gccgagtata ggataatatt tgagaagctt 840
gagaatgcag tgaaactcgg tgctaatgta gtttatctca aattgccaat tggtgattta 900
gcaacacaat actttgcaga taaaaatgta ttttgtgccg ccgggttga tgaaaatgat 960
cttataagaa cgagtaaagc tactggtgct tctattcaaa ccactctcaa taacctttca 1020
gttgacgtct taggaacttg tggtgtgttt gaggaagtgc aaattgggtc tgaacgttac 1080
aatatgttca cagattgcaa gagtgcaaaa acctgtacaa ttgtgttgag aggtggaggt 1140
cagcagttca ttgatgaatc tgaacgttca ctccatgacg cgattatgat tgtcagaaga 1200
gcaactaaat gtaatactat ccttcccgga gctggtgcca ttgagatgtt gctctcaact 1260
tatctcctcc actattctct caacactatt aatcccacag actctgtcaa ccatgttaac 1320
tgcgttaact ccgtaaatca tgttaatgga gttactgggg tgaataagag tctggtgggt 1380
aagaggcaca taataatgaa cgggtttgca aaggcattgg agtgtattcc aaggaattta 1440
```

```
gccactaatt ctggctacaa ttcaaatgat ttattatcga tactaagaaa taaatacaat 1500
caattggaaa tagtcaatgg agagataaag gtgaataatg aggagagttg gtatggaata 1560
gattgttaca agggaagtgt atgtaacgca tacaaggctt gtatttggga gccgagtttg 1620
gtgaaaaaaa actcaatttа ctcagctact gaagcagctt gccttgttct ctcagttgat 1680
gaaactgtca aaaaccaatc cagacaacag ttacaaagcg cactaccaca acccaaataa 1740
```

<210> 20
<211> 468
<212> DNA
<213> Theileria parva

<400> 20
```
atgccgaaaa ataaaggcaa aggaggaaag aaccggagac gcggtaaaaa tgacaatgaa 60
ggcgaaaaaa gagaattagt cttcaaaatg gaagatcaag aatatgctca agttttacgt 120
atgctcggta atggcagact tgaagcctac tgttttgacg gcactaaacg tctttgccat 180
attagaggaa agatgaggaa gcgagtttgg gtaaatgccg gcgatattat tttggtatcg 240
cttagagatt tccaggacag caaggctgac gtgatcgcaa agtacactgc tgaggaggct 300
cgtactctga aggcttacgg cgagttgcct gaagcgacca aaatcaacga aactgacgtg 360
tacgacgacg aggccgacaa ctgcattgac ttccaggacg tatcgtctga atcagaacct 420
gaggatgagt cacaagagga gtcggatttc gatatcgatg atttataa         468
```

<210> 21
<211> 2166
<212> DNA
<213> Theileria parva

<400> 21
```
atgacatcaa aggacgagac acctgatcag gaggtctacg cttttaatgc tgatatctcc 60
cagcttttaa gcttgatcat caacgcattt tatagtaaca aggagatttt ccttcgtgaa 120
ctcattagca acgctagcga cgcactggaa aaaattaggt atgaggcaat caaggatcca 180
aagcaaatcg aggatcaacc cgattactat atcaggctgt atgccgacaa gaacaacaac 240
accctcacaa tcgaagattc cggtattggc atgaccaaag ccgacctcgt gaacaacctc 300
ggtacaattg ccaaatccgg cacaagagca ttcatggagg cactgcaagc aggctcggac 360
atgtcaatga tcggacagtt tggtgtcggt ttctactcag catacctggt cgcagataag 420
gtgacagtag tgtccaagaa caacgcagac gaccagtacg tctgggagtc aacagcctca 480
ggccacttta cagtgaagaa ggacgactcg cacgagccgc tcaaaagagg aactagacta 540
atactgcact tgaaggagga ccaaactgag taccttgagg agagaaggct gaaagagctt 600
gttaagaagc acagcgagtt catttcattc ccaatctcgc tctcagtaga gaagacccag 660
gagaccgagg tcactgacga cgaggcagag ctagacgagg acaagaagcc cgaggaggag 720
aagcccaagg acgataaggt ggaggacgtt actgacgaga aagtgaccga cgtcactgac 780
gaggaggaga aaaaggagga aaagaaaaag aagaagagga aggtcaccaa cgtaacgcgt 840
gagtgggaaa tgcttaacaa gcagaagcca atttggatga gactcccgtc tgaagtcacc 900
aacgaagaat atgcagcgtt ctacaagaac ttaaccaacg attgggaaga ccacttggcc 960
gtgaaacact tcagcgttga gggtcagctt gagttcaaag ctctactgtt cgtcccaaga 1020
agagcgccgt ttgacatgtt cgagtcccgc aaaaagaaaa acaacatcaa gttgtacgtc 1080
agacgcgtat ttatcatgga cgactgtgag gagctcatcc cggagtggct ttcctttgtg 1140
aagggtgtgg tagactcaga ggacctgccc ttgaatattt ctagggaaac tctccagcag 1200
aacaagatcc tcaaggtcat caggaagaac ttggtgaaaa agtgcctcga gctcttcaat 1260
gaactcactg agaagaagga ggacttcaag aagttctacg agcagttcag caagaacctg 1320
aagctgggaa tccacgagga caacgctaat cgctcaaaga tcgccgaact gttgaggttc 1380
gagacaacca agagcggaga cgaactcgtg tcactcaagg agtacgttga caggatgaag 1440
agtgaccaga agtatgtgta ctacatcacg ggagagtcga agcagagcgt agcctcaagt 1500
cctttccttg agaccctgag ggctcgcgac tacgaagtcc tgtacatgac tgacccaatt 1560
gatgagtacg cagttcagca gatcaaggag tttgaaggca agaaactcaa gtgctgtacc 1620
aaggagggcc tggaccttga tgagggcgag gatgaaaaga agtcctttga agcgctcaag 1680
```

```
gaagaaatgg aacctctttg caagcacatc aaggaagtgc tccacgacaa ggtggaaaag 1740
gtcgtgtgtg gaacaaggtt taccgactct ccatgcgcac ttgtcaccag cgagttcggc 1800
tggagcgcga acatggagcg tatcatgaaa gcacaagctc tcagagactc gtccataaca 1860
agctacatgc tgagcaagaa gatcatggag attaacccga gacatagcat catgaaggag 1920
ctcaaaacta gagctgcaaa cgacaaaaca gataaaaccg tcaaggacct agtctggctt 1980
ctctacgaca cagcgctctt aacctcaggg tttaacctcg atgagcccac ccagtttgga 2040
aacaggatct acaggatgat caagctcgga ctctcattgg acgacgagga acacgtagaa 2100
gaggactcat caatgccgcc gctggatgag cccgttgtcg actccaaaat ggaggaagtt 2160
gactaa                                                             2166
```

<210> 22
<211> 1323
<212> DNA
<213> Theileria parva

<400> 22
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atgcttggaa atcatgtcat gggatctaat tcccccaca ttaaaatttt atcatctgtt 60
acattcttac atattgctaa aatggaagaa gtagaaaacg taaaagtcga cgccttggag 120
cgtgttgaca ctgagtctgt ccttaattat gacactgtgt tagaaaagaa accattgcgc 180
agcagtgttg cctctttctt caaaagatac agtgctgttc tcgtaatatt aactgccgtg 240
ctattattca cattcacttt tgcagcaata gcattgtcat caggcagaag cgcaatcaga 300
aagaacagag aactcctgtc agtcgaattt gaaaagcttc agttcgataa tttcgtgaca 360
attaagggag aaagggaaga ggacttcccc aagatggtag ctgaagttct ttacaaggtt 420
gcagtcgagt ttgacccaaa agaagaggcc ttgatctacg tccagttcaa tgacttcaac 480
aagcaacacg acaagaagca caacaattac aggcacaaga agacctcgta caccaacttc 540
agaaacaacc ttaatgatat aaacgagcac aacgcaaaac caaacctgtc gtacaccaag 600
aacatgaacc acttcggtga catatcatcc aaggatttca tgaagagata caccaagaaa 660
gtactcttga acttgccaaa agaccacgtg tccacctata acaacaacag accaatgtca 720
gttgatctca gaagccatgg tgtattgact ccagtcaagt gccaagaaga aaatgaactc 780
tcatggccat actccgtagt agcagtcgcc gagtcattcg ttaagaagac atcacaaaag 840
accgtatccc tcagcgaaaa acaattagta gattgcgtta cagataagaa atctgcaaac 900
aacccattct tgggttacaa ataccttaag gacttgggtc tgttcgaatc agaactcgta 960
gacaaatcca caaccaagtg cccagcattg gaaggtgaaa gattcaaagt cccatcatac 1020
tcatactcat atgagccaga tttggtggca ctcttgttga atgcaggacc actcactgta 1080
ccagttgcag tgagcgagga ttggcaattc tacgctgatg gaaccttgga tgtatgcggt 1140
gctgaattga accacttctt gaccctagta ggtgtcagct ttgacgaaaa aggcaatcac 1200
tggatactca aaaactcatt cggtgaaggc tggggaaaca agggatacct actgttgact 1260
cgcaatagca aggaatacaa agatgattgt ggattgacct ccttcgcagt gtacgcagtt 1320
taa                                                               1323
```

<210> 23
<211> 33
<212> DNA
<213> Theileria parva

<400> 23
```
gtagggtatc caaaggttaa agaagaaatg cta                                 33
```

<210> 24
<211> 33
<212> DNA
<213> Theileria parva
```

<400> 24
agtcatgaag aactaaaaaa attgggaatg cta                                33


<210> 25
<211> 33
<212> DNA
<213> Theileria parva

<400> 25
aaatcatcac atggtatggg aaaggtagga aaa                                33


<210> 26
<211> 27
<212> DNA
<213> Theileria parva

<400> 26
tttgcacaaa gcctagtgtg cgtatta                                       27


<210> 27
<211> 27
<212> DNA
<213> Theileria parva

<400> 27
caaagcctag tgtgcgtatt aatgaaa                                       27


<210> 28
<211> 27
<212> DNA
<213> Theileria parva

<400> 28
actggtgctt ctattcaaac cactctc                                      27


<210> 29
<211> 27
<212> DNA
<213> Theileria parva

<400> 29
agcaaggctg acgtgatcgc aaagtac                                       27


<210> 30
<211> 27
<212> DNA
<213> Theileria parva

<400> 30
agcaaggctg acgtgatcgc aaagtac                                       27

```
<210> 31
<211> 27
<212> DNA
<213> Theileria parva

<400> 31
tgcggtgctg aattgaacca cttcttg                                    27


<210> 32
<211> 16
<212> PRT
<213> Theileria parva

<400> 32
Phe Leu Val Gly Tyr Pro Lys Val Lys Glu Glu Met Leu Glu Met Ala
  1               5                  10                  15


<210> 33
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
      Primer

<400> 33
ggatccccgg aaaaagaaga ggaactc                                    27


<210> 34
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
      Primer

<400> 34
aatgtagttt tatctaaatt gcca                                       24


<210> 35
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
      Primer

<400> 35
ggatccgaaa tggcgaaaaa taaaggcaaa gga                             33
```

```
<210> 36
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
      Primer

<400> 36
gccaagaatt cgatgacatc aaaggacgag                              30


<210> 37
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
      Primer

<400> 37
ctgcagttaa ttttttgaggt aaattttg                              28


<210> 38
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
      Primer

<400> 38
gaggagataa gttgagagca acatc                                  25


<210> 39
<211> 31
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
      Primer

<400> 39
ctgcagttat aaatcatcga tatcgaaatc t                           31


<210> 40
<211> 30
<212> DNA
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<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
     Primer

<400> 40
ggcgcggccg cgtcaacttc ctccattttg   30

<210> 41
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
     Primer

<400> 41
atggccactt caattgcatt tgcc   24

<210> 42
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
     Primer

<400> 42
ttaaatgaaa tatttatgag cttc   24

<210> 43
<211> 157
<212> PRT
<213> Theileria parva

<400> 43
Met Arg Val Lys Lys Val Leu Leu Tyr Thr Leu Pro Val Val Gly Ile
 1   5   10   15

Leu Leu Ala Gly Ser Leu Ile Ile Phe Asn Phe Val Arg Lys Arg Pro
            20   25   30

Glu Lys Glu Glu Glu Leu Lys Pro Pro Ser Ala Leu Glu Asp Glu Leu
        35   40   45

Lys Lys Arg Glu Glu Glu Ser Arg Lys Arg Met Glu Glu Met Gln Lys
    50   55   60

Glu Ile Leu Glu Lys Lys Leu Arg Glu Gly Lys Lys Ala Leu Glu Glu
65   70   75   80

```
Leu Glu Lys Arg Glu Lys Glu Val Val Asp Glu Phe Ala Lys His Leu
              85              90                  95

Lys Lys Pro Glu Glu Arg Leu Pro Lys Ile Ile Asp Ser Gly Phe Pro
            100             105             110

Thr Val Asp Pro Ile Thr Tyr Thr Ser Gly Val Tyr Met Val Ala Val
            115             120             125

Ser Lys Thr Thr Phe Thr Ser Asp Ser Asp Leu Val Asp Phe Thr His
    130             135             140

Thr Leu Leu Gly Ile Lys Phe Leu Val Thr Gly Val Gln
145             150             155
```

<210> 44
<211> 107
<212> PRT
<213> Theileria parva

<400> 44
```
Met Arg Val Lys Lys Val Leu Leu Tyr Thr Leu Pro Val Val Gly Ile
  1           5               10                  15

Leu Leu Ala Gly Ser Leu Ile Ile Phe Asn Phe Val Arg Lys Arg Pro
            20              25              30

Glu Lys Glu Glu Glu Leu Lys Pro Pro Ser Ala Leu Glu Asp Glu Leu
            35              40              45

Lys Lys Arg Glu Glu Glu Ser Arg Lys Arg Met Glu Glu Met Gln Lys
    50              55              60

Glu Ile Leu Glu Lys Lys Leu Arg Glu Gly Lys Lys Ala Leu Glu Glu
 65              70              75              80

Leu Glu Lys Arg Glu Lys Glu Val Val Asp Glu Phe Ala Lys His Leu
              85              90                  95

Lys Lys Pro Glu Glu Arg Leu Pro Lys Ile Ile
            100             105
```

<210> 45
<211> 103
<212> PRT
<213> Theileria parva

<400> 45
```
Met Arg Val Lys Lys Val Leu Leu Tyr Thr Leu Pro Val Val Gly Ile
  1           5               10                  15

Leu Leu Ala Gly Ser Leu Ile Ile Phe Asn Phe Val Arg Lys Arg Pro
            20              25              30
```

```
Glu Lys Glu Glu Glu Leu Lys Pro Pro Ser Ala Leu Glu Asp Glu Leu
         35              40                  45

Lys Lys Arg Glu Glu Glu Ser Arg Lys Arg Met Glu Glu Met Gln Lys
         50              55                  60

Glu Ile Leu Glu Lys Lys Leu Arg Glu Gly Lys Lys Ala Leu Glu Glu
 65              70                  75                  80

Leu Glu Lys Arg Glu Lys Glu Val Val Asp Glu Phe Ala Lys His Leu
             85              90                  95

Lys Lys Pro Glu Glu Arg Leu
            100
```

```
<210> 46
<211> 37
<212> PRT
<213> Theileria parva

<400> 46
Met Arg Val Lys Lys Val Leu Leu Tyr Thr Leu Pro Val Val Gly Ile
 1           5               10                  15

Leu Leu Ala Gly Ser Leu Ile Ile Phe Asn Phe Val Arg Lys Arg Pro
             20              25                  30

Glu Lys Glu Glu Glu
         35
```

```
<210> 47
<211> 66
<212> PRT
<213> Theileria parva

<400> 47
Met Pro Gly Pro Asp Ser Lys Pro Ile Phe Phe Lys Asn Asp Gly Asp
 1           5               10                  15

Lys Phe Leu Arg Cys Val Gly Tyr Pro Lys Val Lys Glu Glu Met Leu
             20              25                  30

Glu Met Ala Thr Lys Phe Asn Arg Leu Pro Lys Gly Val Glu Ile Pro
         35              40                  45

Ala Pro Pro Gly Val Lys Pro Glu Ala Pro Thr Pro Thr Pro Thr Thr
         50              55                  60

Ile Thr
 65
```

```
<210> 48
<211> 68
<212> PRT
```

<213> Theileria parva

<400> 48
Met Pro Thr Pro Thr Thr Ile Thr Pro Ser Val Pro Pro Thr Ile Pro
 1   5   10   15

Thr Pro Ile Thr Pro Ser Ala Pro Pro Thr Thr Pro Pro Thr Gly Leu
             20   25   30

Asn Phe Asn Leu Thr Val Gln Asn Lys Phe Met Ile Gly Ser Gln Glu
         35   40   45

Val Lys Leu Asn Ile Thr His Glu Tyr Glu Gly Val Tyr Glu Ala His
     50   55   60

Lys Tyr Phe Ile
 65

<210> 49
<211> 62
<212> PRT
<213> Theileria parva

<400> 49
Met Gly Val Tyr Glu Ala His Lys Tyr Phe Ile Glu Arg Gly Ser Phe
 1   5   10   15

Thr Pro Thr Ser Phe Ser Ile Gly Asp Leu Pro Gln Thr Gly Leu Pro
             20   25   30

Val Asn Gln Thr Val Asp Thr Ile Val Val Tyr Phe His Arg Val Thr
         35   40   45

Met Gly Glu Pro Val Gly Ile Pro Leu Ile Val Leu Ile Phe
     50   55   60

<210> 50
<211> 148
<212> PRT
<213> Theileria parva

<400> 50
Met Pro Gly Pro Asp Ser Lys Pro Ile Phe Phe Lys Asn Asp Gly Asp
 1   5   10   15

Lys Phe Leu Arg Cys Val Gly Tyr Pro Lys Val Lys Glu Glu Met Leu
             20   25   30

Glu Met Ala Thr Lys Phe Asn Arg Leu Pro Lys Gly Val Glu Ile Pro
         35   40   45

Ala Pro Pro Gly Val Lys Pro Glu Ala Pro Thr Pro Thr Thr Ile Thr
     50   55   60

```
Pro Ser Val Pro Pro Thr Ile Pro Thr Pro Ile Thr Pro Ser Ala Pro
65              70          75          80

Pro Thr Thr Pro Pro Thr Gly Leu Asn Phe Asn Leu Thr Val Gln Asn
                85          90              95

Lys Phe Lys Phe Met Ile Gly Ser Gln Glu Val Lys Leu Asn Ile Thr
            100          105          110

His Glu Tyr Glu Gly Val Tyr Glu Ala His Lys Tyr Phe Ile Glu Arg
        115          120          125

Gly Ser Phe Thr Pro Thr Ser Phe Ser Ile Gly Asp Leu Pro Gln Thr
    130          135          140

Gly Leu Pro Val
145
```

```
<210> 51
<211> 121
<212> PRT
<213> Theileria parva

<400> 51
Met Pro Thr Pro Thr Thr Ile Thr Pro Ser Val Pro Pro Thr Ile Pro
1           5           10          15

Thr Pro Ile Thr Pro Ser Ala Pro Pro Thr Thr Pro Pro Thr Gly Leu
            20          25          30

Asn Phe Asn Leu Thr Val Gln Asn Lys Phe Lys Phe Met Ile Gly Ser
        35          40          45

Gln Glu Val Lys Leu Asn Ile Thr His Glu Tyr Glu Gly Val Tyr Glu
    50          55          60

Ala His Lys Tyr Phe Ile Glu Arg Gly Ser Phe Thr Pro Thr Ser Phe
65          70          75          80

Ser Ile Gly Asp Leu Pro Gln Thr Gly Leu Pro Val Asn Gln Thr Val
            85          90              95

Asp Thr Ile Val Val Tyr Phe His Arg Val Thr Met Gly Glu Pro Val
            100          105          110

Gly Ile Pro Leu Ile Val Leu Ile Phe
        115          120
```

```
<210> 52
<211> 177
<212> PRT
<213> Theileria parva
```

<400> 52

```
Met Pro Gly Pro Asp Ser Lys Pro Ile Phe Phe Lys Asn Asp Gly Asp
 1               5                  10                  15

Lys Phe Leu Arg Cys Val Gly Tyr Pro Lys Val Lys Glu Glu Met Leu
            20                  25                  30

Glu Met Ala Thr Lys Phe Asn Arg Leu Pro Lys Gly Val Glu Ile Pro
        35                  40                  45

Ala Pro Pro Gly Val Lys Pro Glu Ala Pro Thr Pro Thr Thr Ile Thr
    50                  55                  60

Pro Ser Val Pro Pro Thr Ile Pro Thr Pro Ile Thr Pro Ser Ala Pro
65                  70                  75                  80

Pro Thr Thr Pro Pro Thr Gly Leu Asn Phe Asn Leu Thr Val Gln Asn
                85                  90                  95

Lys Phe Lys Phe Met Ile Gly Ser Gln Glu Val Lys Leu Asn Ile Thr
            100                 105                 110

His Glu Tyr Glu Gly Val Tyr Glu Ala His Lys Tyr Phe Ile Glu Arg
        115                 120                 125

Gly Ser Phe Thr Pro Thr Ser Phe Ser Ile Gly Asp Leu Pro Gln Thr
    130                 135                 140

Gly Leu Pro Val Asn Gln Thr Val Asp Thr Ile Val Val Tyr Phe His
145                 150                 155                 160

Arg Val Thr Met Gly Glu Pro Val Gly Ile Pro Leu Ile Val Leu Ile
                165                 170                 175

Phe
```

<210> 53
<211> 543
<212> PRT
<213> Theileria parva

<400> 53

```
Met Arg Val Lys Lys Val Leu Leu Tyr Thr Leu Pro Val Val Gly Ile
 1               5                  10                  15

Leu Leu Ala Gly Ser Leu Ile Ile Phe Asn Phe Val Arg Lys Arg Pro
            20                  25                  30

Glu Lys Glu Glu Glu Leu Lys Pro Pro Ser Ala Leu Glu Asp Glu Leu
        35                  40                  45

Lys Lys Arg Glu Glu Glu Ser Arg Lys Arg Met Glu Glu Met Gln Lys
    50                  55                  60
```

```
Glu Ile Leu Glu Lys Lys Leu Arg Glu Gly Lys Lys Ala Leu Glu Glu
65                   70                75                80

Leu Glu Lys Cys Glu Lys Glu Met Val Asp Glu Phe Glu Lys His Leu
              85              90                95

Lys Lys Pro Glu Glu Arg Leu Pro Lys Ile Ile Leu Ile Leu Asp Ser
            100             105             110

Gly Phe Pro Thr Val Asp Pro Ile Thr Tyr Thr Ser Gly Val Tyr Met
            115             120             125

Val Ala Val Ser Lys Thr Thr Phe Thr Ser Asp Ser Asp Leu Val Asp
        130             135             140

Phe Thr His Thr Leu Leu Gly Ile Lys Phe Leu Val Ala Gly Val Gln
145             150             155             160

Phe Gly Gly Lys Thr Tyr Thr Ile Lys Pro Ile Glu Ala Thr Met Ala
            165             170             175

Thr Ser Ile Ala Phe Ala Ala Asp Pro Gly Phe Cys Tyr Phe Leu Leu
            180             185             190

Ile Pro Gly Pro Asp Ser Lys Pro Ile Phe Phe Lys Asn Asp Gly Asp
            195             200             205

Lys Phe Leu Arg Cys Val Gly Tyr Pro Lys Val Lys Glu Glu Ile Ile
    210             215             220

Glu Met Ala Thr Lys Phe Asn Arg Leu Pro Lys Gly Val Glu Ile Pro
225             230             235             240

Ala Pro Pro Gly Val Lys Pro Glu Ala Pro Thr Pro Thr Pro Thr Thr
            245             250             255

Ile Thr Pro Ser Val Pro Pro Thr Ile Pro Thr Pro Ile Thr Pro Ser
            260             265             270

Ala Pro Pro Thr Thr Pro Pro Thr Gly Leu Asn Phe Asn Leu Thr Val
            275             280             285

Gln Asn Lys Phe Met Val Gly Ser Gln Glu Val Lys Leu Asn Ile Thr
    290             295             300

His Glu Tyr Asp Gly Val Tyr Glu Ala His Lys Tyr Phe Ile Glu Lys
305             310             315             320

Gly Arg Phe Thr Pro Thr Ser Phe Ser Ile Gly Ala Asp Pro Gln Thr
            325             330             335

Gly Leu Pro Val Asn Gln Thr Val Asp Thr Ile Val Val Tyr Phe His
            340             345             350

Arg Val Thr Met Gly Glu Pro Val Gly Ile Pro Leu Ile Val Leu Val
    355             360             365
```

Phe Tyr Lys Asn Gln Ser Thr Lys Tyr Leu Asn Lys Gly Asn Gly Asn
    370   375   380

Trp Glu Glu Ser Lys Ala Leu Leu Phe Arg Glu Glu Leu Asp Phe Leu
385   390   395   400

Asp Ser Met Phe Asn Gly Tyr Val Thr Val Asn Leu Ser Arg Arg Ser
                405   410   415

Asp Tyr Tyr Arg Asn Gly Thr Gly Thr Ser Glu Ile Glu Lys Thr Leu
            420   425   430

Asp Met Asn Val Tyr Val Glu Pro Asp Thr Pro Cys Leu Gly Trp Thr
        435   440   445

Thr Tyr Ile His Lys Leu Glu Glu Gly Gly Glu Gly Gly Ile Glu Lys
    450   455   460

Pro Phe Gln Ile Arg Gln Leu Trp Phe Ser Lys Gln Lys Phe Asp Ile
465   470   475   480

Phe Pro Met Gly Lys Val Ser Ile Val Asn Val Tyr Gly Lys Asn Asp
            485   490   495

Glu Pro Leu Ser Tyr Ala Pro Ser Ile Phe Ser Val Ile Arg Glu Asp
            500   505   510

Gly Ile Gln Ile Phe Tyr Val Arg Ala Tyr Ser Gln Tyr Leu Leu Asp
        515   520   525

Ser Ser Val Asn Pro Gln Asn Leu Pro Gln Lys Leu Thr Ala Glu
    530   535   540

<210> 54
<211> 72
<212> PRT
<213> Theileria parva

<400> 54
Met Ala Thr Ser Ile Ala Phe Ala Ala Asp Pro Gly Phe Cys Tyr Phe
1   5   10   15

Leu Leu Ile Pro Gly Pro Asp Ser Lys Pro Ile Phe Phe Lys Asn Asp
            20   25   30

Gly Asp Lys Phe Leu Arg Cys Val Gly Tyr Pro Lys Val Lys Glu Glu
            35   40   45

Met Leu Glu Met Ala Thr Lys Phe Asn Arg Leu Pro Lys Gly Val Glu
    50   55   60

Ile Pro Ala Pro Pro Gly Val Lys
65   70

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<210> 55
<211> 72
<212> PRT
<213> Theileria parva

<400> 55
Met Ala Thr Ser Ile Ala Phe Ala Ala Asp Pro Gly Phe Cys Tyr Phe
 1               5                   10                  15

Leu Leu Ile Pro Gly Pro Asp Ser Lys Pro Ile Phe Phe Lys Asn Asp
            20                  25                  30

Gly Asp Lys Phe Leu Arg Cys Val Gly Tyr Pro Lys Val Lys Glu Glu
            35              40                  45

Met Leu Glu Met Ala Thr Lys Phe Asn Arg Leu Pro Lys Gly Val Glu
        50              55                  60

Ile Pro Ala Pro Pro Gly Val Lys
    65              70


<210> 56
<211> 72
<212> PRT
<213> Theileria parva

<400> 56
Met Ala Thr Ser Ile Ala Phe Ala Ala Asp Pro Gly Phe Cys Tyr Phe
 1               5                   10                  15

Leu Leu Ile Pro Gly Pro Asp Ser Lys Pro Ile Phe Phe Lys Asn Asp
            20                  25                  30

Gly Asp Lys Phe Leu Arg Cys Val Gly Tyr Pro Lys Val Lys Glu Glu
            35              40                  45

Met Leu Glu Met Ala Thr Lys Phe Asn Arg Leu Pro Lys Gly Val Glu
        50              55                  60

Ile Pro Ala Pro Pro Gly Val Lys
    65              70


<210> 57
<211> 72
<212> PRT
<213> Theileria parva

<400> 57
Met Ala Thr Ser Ile Ala Phe Ala Ala Asp Pro Gly Phe Cys Tyr Phe
 1               5                   10                  15

Leu Leu Ile Pro Gly Pro Asp Ser Lys Pro Ile Phe Phe Lys Asn Asp
            20                  25                  30
```

```
Gly Asp Lys Phe Leu Arg Cys Val Gly Tyr Pro Lys Val Lys Glu Glu
        35                  40              45

Met Leu Glu Met Ala Thr Lys Phe Asn Arg Leu Pro Lys Gly Val Glu
    50                  55                  60

Ile Pro Ala Pro Pro Gly Val Lys
65                  70
```

```
<210> 58
<211> 72
<212> PRT
<213> Theileria parva
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```
<400> 58
Met Ala Thr Ser Ile Ala Phe Ala Ala Asp Pro Gly Phe Cys Tyr Phe
1               5               10                  15

Leu Leu Ile Pro Gly Pro Asp Ser Lys Pro Ile Phe Phe Lys Asn Asp
            20              25                  30

Gly Asp Lys Phe Leu Arg Cys Val Gly Tyr Pro Lys Val Lys Glu Glu
        35                  40              45

Met Leu Glu Met Ala Thr Lys Phe Asn Arg Leu Pro Lys Gly Val Glu
    50                  55                  60

Ile Pro Ala Pro Pro Gly Val Lys
65                  70
```

```
<210> 59
<211> 72
<212> PRT
<213> Theileria parva
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```
<400> 59
Met Ala Thr Ser Ile Ala Phe Ala Ala Asp Pro Gly Phe Cys Tyr Phe
1               5               10                  15

Leu Leu Ile Pro Gly Pro Asp Ser Lys Pro Ile Phe Leu Lys Asn Asp
            20              25                  30

Gly Asp Lys Phe Leu Arg Cys Val Gly Tyr Pro Lys Val Lys Glu Glu
        35                  40              45

Met Leu Glu Met Ala Thr Lys Phe Asn Arg Leu Pro Lys Gly Val Glu
    50                  55                  60

Ile Pro Ala Pro Pro Gly Val Lys
65                  70
```

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<210> 60
<211> 72
<212> PRT
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<213> Theileria parva

<400> 60
Met Ala Thr Ser Ile Ala Phe Ala Ala Asp Pro Gly Phe Cys Tyr Phe
 1               5                  10                  15

Leu Leu Ile Pro Gly Pro Asp Ser Lys Pro Ile Phe Phe Lys Asn Asp
            20                  25                  30

Gly Asp Lys Phe Leu Arg Cys Val Gly Tyr Pro Lys Val Lys Glu Glu
            35                  40                  45

Ile Ile Glu Met Ala Thr Lys Phe Asn Arg Leu Pro Lys Gly Val Glu
    50                  55                  60

Ile Pro Ala Pro Pro Gly Val Lys
65                  70


<210> 61
<211> 70
<212> PRT
<213> Theileria parva

<400> 61
Met Ala Thr Ser Ile Ala Phe Ala Ala Asp Pro Gly Ile Cys Tyr Phe
 1               5                  10                  15

Leu Leu Ile Pro Ala Pro Lys Pro Ile Phe Phe Lys Asn Asp Gly Asp
            20                  25                  30

Lys Phe Leu Arg Cys Val Gly Tyr Pro Lys Val Lys Glu Glu Ile Ile
            35                  40                  45

Glu Met Ala Thr Lys Phe Asn Arg Leu Pro Lys Gly Val Glu Ile Pro
    50                  55                  60

Ala Pro Pro Gly Val Lys
65                  70


<210> 62
<211> 72
<212> PRT
<213> Theileria parva

<400> 62
Met Ala Thr Ser Ile Ala Phe Ala Ala Asp Pro Gly Phe Cys Tyr Phe
 1               5                  10                  15

Leu Leu Ile Pro Gly Pro Asp Ser Lys Pro Ile Phe Phe Lys Asn Asp
            20                  25                  30

Gly Asp Lys Phe Leu Arg Cys Val Gly Tyr Pro Lys Val Lys Glu Glu
            35                  40                  45
```

```
Ile Leu Glu Met Ala Thr Lys Phe Asn Arg Leu Pro Lys Gly Val Glu
    50              55                  60

Ile Pro Ala Pro Pro Gly Val Lys
65              70


<210> 63
<211> 72
<212> PRT
<213> Theileria parva

<400> 63
Met Ala Thr Ser Ile Ala Phe Ala Ala Asp Pro Gly Phe Cys Tyr Phe
    1           5               10                  15

Leu Leu Ile Pro Gly Pro Asp Ser Lys Pro Ile Phe Phe Lys Asn Asp
            20              25                  30

Gly Asp Lys Phe Leu Arg Cys Val Gly Tyr Pro Lys Val Lys Glu Glu
        35              40                  45

Ile Leu Glu Met Ala Thr Lys Phe Asn Arg Leu Pro Lys Gly Val Glu
    50              55                  60

Ile Pro Ala Pro Pro Gly Val Lys
65              70


<210> 64
<211> 72
<212> PRT
<213> Theileria parva

<400> 64
Met Ala Thr Ser Ile Ala Phe Ala Ala Asp Pro Gly Phe Cys Tyr Phe
    1           5               10                  15

Leu Leu Ile Pro Gly Pro Asp Ser Lys Pro Ile Phe Phe Lys Asn Asp
            20              25                  30

Gly Asp Lys Phe Leu Arg Cys Val Gly Tyr Pro Lys Val Lys Glu Glu
        35              40                  45

Ile Ile Glu Met Ala Thr Lys Phe Asn Arg Leu Pro Lys Gly Val Glu
    50              55                  60

Ile Pro Ala Pro Pro Gly Val Lys
65              70


<210> 65
<211> 72
<212> PRT
<213> Theileria parva
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```
<400> 65
Met Ala Thr Ser Ile Ala Phe Ala Ala Asp Pro Gly Phe Cys Tyr Phe
1               5               10              15

Leu Leu Ile Pro Gly Pro Asp Ser Lys Pro Ile Phe Phe Lys Asn Asp
            20              25              30

Gly Asp Lys Phe Leu Arg Cys Val Gly Tyr Pro Lys Val Lys Glu Glu
        35              40              45

Ile Ile Glu Met Ala Thr Lys Phe Asn Arg Leu Pro Lys Gly Val Glu
    50              55              60

Ile Pro Ala Pro Pro Gly Val Lys
65              70


<210> 66
<211> 72
<212> PRT
<213> Theileria parva

<400> 66
Pro Glu Ala Pro Thr Pro Thr Pro Thr Thr Ile Thr Pro Ser Val Pro
1               5               10              15

Pro Thr Ile Pro Thr Pro Ile Thr Pro Ser Ala Pro Pro Thr Thr Pro
            20              25              30

Pro Thr Gly Leu Asn Phe Asn Leu Thr Val Gln Asn Lys Phe Met Ile
        35              40              45

Gly Ser Gln Glu Val Lys Leu Asn Ile Thr His Glu Tyr Glu Gly Val
    50              55              60

Tyr Glu Ala His Lys Tyr Phe Ile
65              70


<210> 67
<211> 72
<212> PRT
<213> Theileria parva

<400> 67
Pro Glu Ala Pro Thr Pro Thr Pro Thr Thr Ile Thr Pro Ser Val Pro
1               5               10              15

Pro Thr Ile Pro Thr Pro Ile Thr Pro Ser Ala Pro Pro Thr Thr Pro
            20              25              30

Pro Thr Gly Leu Asn Phe Asn Leu Thr Val Gln Asn Lys Phe Met Ile
        35              40              45

Gly Ser Gln Glu Val Lys Leu Asn Ile Thr His Glu Tyr Glu Gly Val
    50              55              60
```

```
Tyr Glu Ala His Lys Tyr Phe Ile
65                  70


<210> 68
<211> 72
<212> PRT
<213> Theileria parva

<400> 68
Pro Glu Ala Pro Thr Pro Thr Pro Thr Thr Ile Thr Pro Ser Val Pro
 1               5                   10                  15

Pro Thr Ile Pro Thr Pro Ile Thr Pro Ser Ala Pro Pro Thr Thr Pro
            20                  25                  30

Pro Thr Gly Leu Asn Phe Asn Leu Thr Val Gln Asn Lys Phe Met Ile
            35                  40                  45

Gly Ser Gln Glu Val Asn Leu Asn Ile Thr His Glu Tyr Glu Gly Val
        50                  55                  60

Tyr Glu Ala His Lys Tyr Phe Ile
65                  70


<210> 69
<211> 72
<212> PRT
<213> Theileria parva

<400> 69
Pro Glu Ala Pro Thr Pro Thr Pro Thr Thr Ile Thr Pro Ser Val Pro
 1               5                   10                  15

Pro Thr Ile Pro Thr Pro Ile Thr Pro Ser Ala Pro Pro Thr Thr Pro
            20                  25                  30

Pro Thr Gly Leu Asn Phe Asn Leu Thr Val Gln Asn Lys Phe Met Ile
            35                  40                  45

Gly Ser Gln Glu Val Asn Leu Asn Ile Thr His Glu Tyr Glu Gly Val
        50                  55                  60

Tyr Glu Ala His Lys Tyr Phe Ile
65                  70


<210> 70
<211> 72
<212> PRT
<213> Theileria parva

<400> 70
Pro Glu Ala Pro Thr Pro Thr Pro Thr Thr Ile Thr Pro Ser Val Pro
 1               5                   10                  15
```

```
Pro Thr Ile Pro Thr Pro Ile Thr Pro Ser Ala Pro Pro Thr Thr Pro
            20            25            30

Pro Thr Gly Leu Asn Phe Asn Leu Thr Val Gln Asn Lys Phe Met Ile
        35            40                45

Gly Ser Gln Glu Val Lys Leu Asn Ile Thr His Glu Tyr Glu Gly Val
    50                55                60

Tyr Glu Ala His Lys Tyr Phe Ile
65                70
```

<210> 71
<211> 64
<212> PRT
<213> Theileria parva

<400> 71
```
Pro Glu Ala Pro Thr Pro Thr Pro Thr Pro Ile Thr Pro Ser Ala Pro
 1             5             10                15

Pro Thr Thr Pro Pro Thr Thr Pro Pro Lys Gly Leu Asn Phe Asn Leu
            20            25                30

Thr Leu Gln Asn Lys Phe Met Ile Gly Ser Gln Glu Val Lys Leu Ser
        35            40                45

Ile Thr His Glu Tyr Asp Gly Val Tyr Glu Ala His Lys Tyr Phe Ile
    50                55                60
```

<210> 72
<211> 72
<212> PRT
<213> Theileria parva

<400> 72
```
Pro Glu Ala Pro Thr Pro Thr Pro Thr Thr Ile Thr Pro Ser Val Pro
 1             5             10                15

Pro Thr Ile Pro Thr Pro Ile Thr Pro Ser Ala Pro Pro Thr Thr Pro
            20            25            30

Pro Thr Gly Leu Asn Phe Asn Leu Thr Val Gln Asn Lys Phe Met Val
        35            40                45

Gly Ser Gln Glu Val Lys Leu Asn Ile Thr His Glu Tyr Asp Gly Val
    50                55                60

Tyr Glu Ala His Lys Tyr Phe Ile
65                70
```

```
<210> 73
<211> 72
<212> PRT
<213> Theileria parva

<400> 73
Pro Glu Ala Pro Thr Pro Thr Pro Thr Thr Ile Thr Pro Ser Val Pro
1               5                   10                  15

Pro Thr Ile Pro Thr Pro Ile Thr Pro Ser Ala Pro Pro Thr Thr Pro
            20              25                  30

Pro Thr Gly Leu Asn Phe Asn Leu Thr Val Gln Asn Lys Phe Met Val
            35              40                  45

Gly Ser Gln Glu Val Lys Leu Asn Ile Thr His Glu Tyr Asp Gly Val
        50              55              60

Tyr Glu Ala His Lys Tyr Phe Ile
65                  70


<210> 74
<211> 72
<212> PRT
<213> Theileria parva

<400> 74
Pro Glu Ala Pro Thr Pro Thr Pro Thr Thr Ile Thr Pro Ser Val Pro
1               5                   10                  15

Pro Thr Ile Pro Thr Pro Ile Thr Pro Ser Ala Pro Pro Thr Thr Pro
            20              25                  30

Pro Thr Gly Leu Asn Phe Asn Leu Thr Val Gln Asn Lys Phe Met Val
            35              40                  45

Gly Ser Gln Glu Val Lys Leu Asn Ile Thr His Glu Tyr Glu Gly Val
        50              55              60

Tyr Glu Ala His Lys Tyr Phe Ile
65                  70


<210> 75
<211> 72
<212> PRT
<213> Theileria parva

<400> 75
Pro Glu Ala Pro Thr Pro Thr Pro Thr Thr Ile Thr Pro Ser Val Pro
1               5                   10                  15

Pro Thr Ile Pro Thr Pro Ile Thr Pro Ser Ala Pro Pro Thr Thr Pro
            20              25                  30
```

```
Pro Thr Gly Leu Asn Phe Asn Leu Thr Val Gln Asn Lys Phe Met Ile
        35              40              45

Gly Ser Pro Glu Val Lys Leu Asn Ile Thr His Glu Tyr Glu Gly Val
        50              55              60

Tyr Glu Ala His Lys Tyr Phe Ile
 65              70


<210> 76
<211> 72
<212> PRT
<213> Theileria parva

<400> 76
Pro Glu Ala Pro Thr Pro Thr Pro Thr Thr Ile Thr Pro Ser Val Pro
 1               5               10              15

Pro Thr Ile Pro Thr Pro Ile Thr Pro Ser Ala Pro Pro Thr Thr Pro
            20              25              30

Pro Thr Gly Leu Asn Phe Asn Leu Thr Val Gln Asn Lys Phe Met Val
        35              40              45

Gly Ser Gln Glu Val Lys Leu Asn Ile Pro His Glu Tyr Asp Gly Val
        50              55              60

Tyr Glu Ala His Lys Tyr Phe Ile
 65              70


<210> 77
<211> 72
<212> PRT
<213> Theileria parva

<400> 77
Pro Glu Ala Pro Thr Pro Thr Pro Thr Thr Ile Thr Pro Ser Val Pro
 1               5               10              15

Pro Thr Ile Pro Thr Pro Ile Thr Pro Ser Ala Pro Pro Thr Thr Pro
            20              25              30

Pro Thr Gly Leu Asn Phe Asn Leu Thr Val Gln Asn Lys Phe Met Val
        35              40              45

Gly Ser Gln Glu Val Lys Leu Asn Ile Thr His Glu Tyr Asp Gly Val
        50              55              60

Tyr Glu Ala His Lys Tyr Phe Ile
 65              70
```